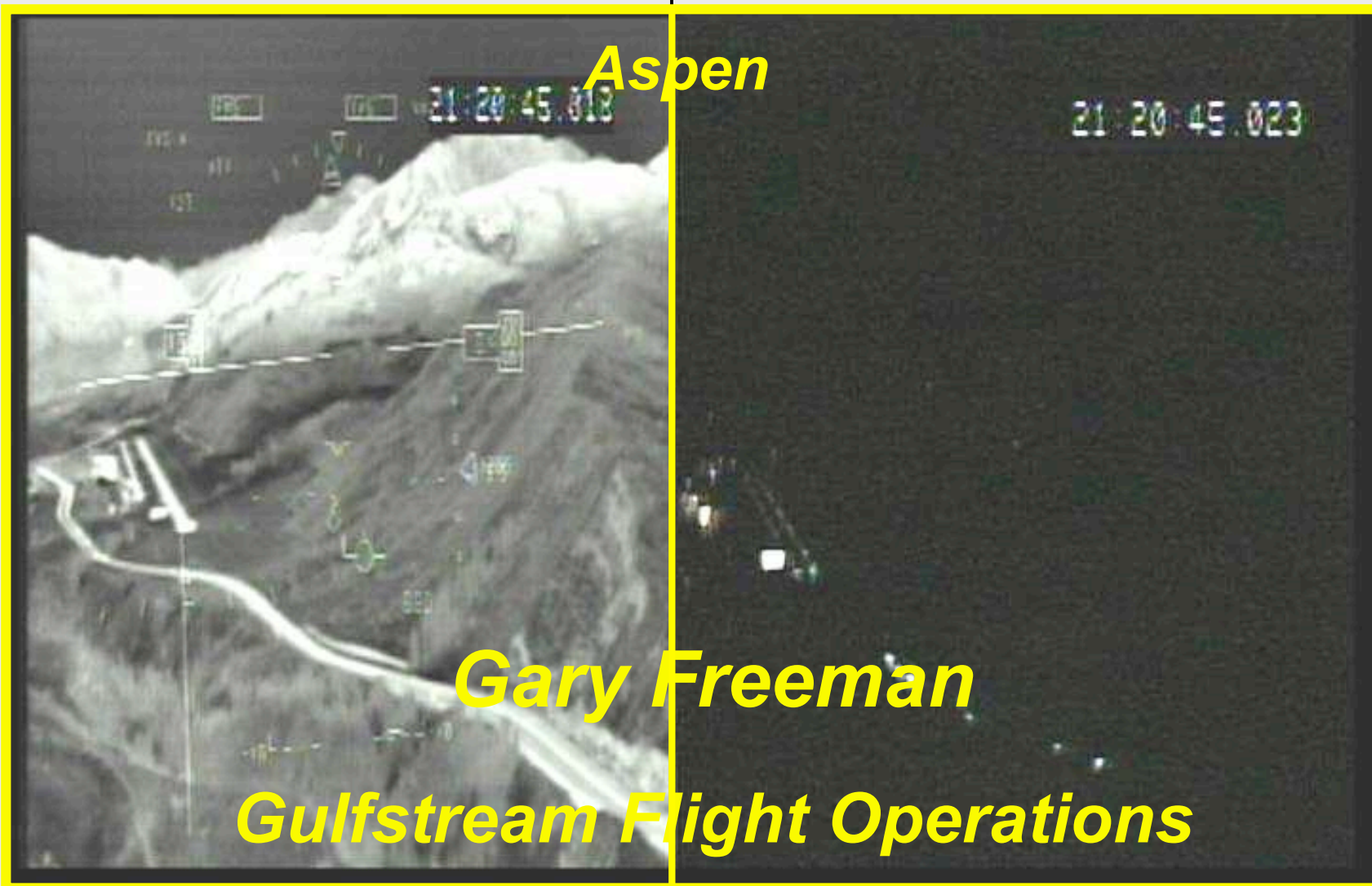


GULFSTREAM ENHANCED VISION

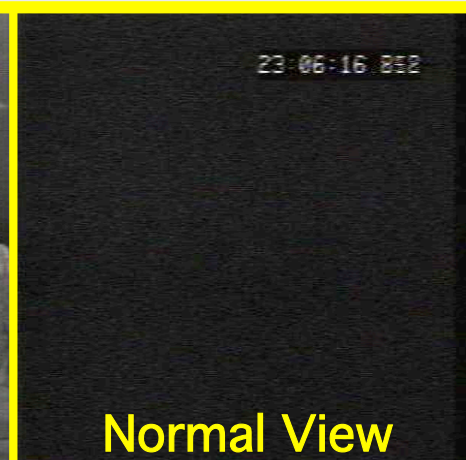
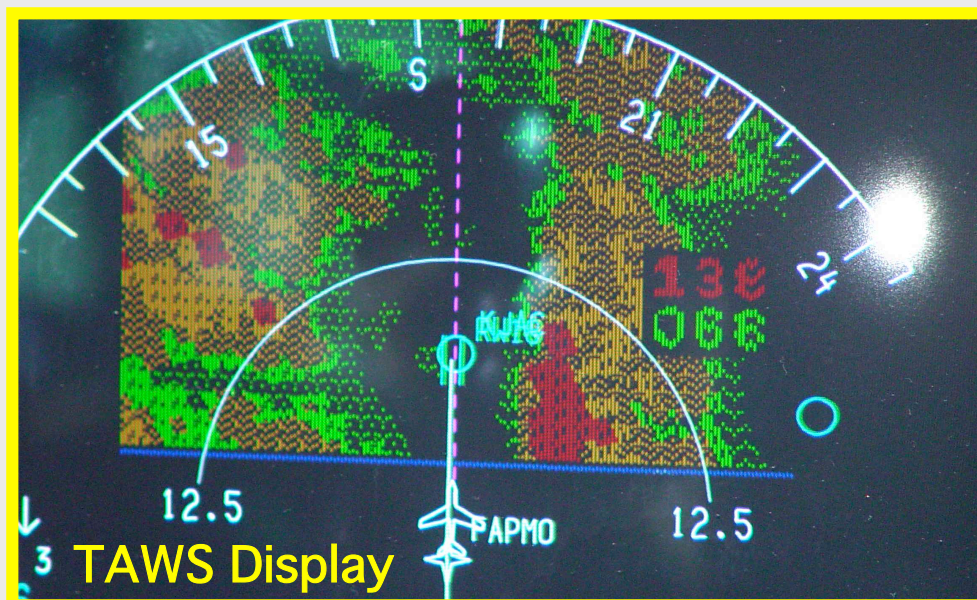




AREAS OF DISCUSSION

- System
- Theory
 - Why Does this Work
 - What's Different
- Why Do We Need This?
 - Safety
 - Operational Capability
- Training
- Certification
 - Proof of Concept
 - Certification
- Dog and Pony
- Summary

Jackson Hole





THE GULFSTREAM EVS

- **System elements:**
- **HUD**
 - Displays Symbology and EVS imagery
 - Synthetic Runways
- **EVS Sensor**
 - Kollsman FLIR
- **Auxiliary Displays**
 - Flat Panels
 - Cabin Display





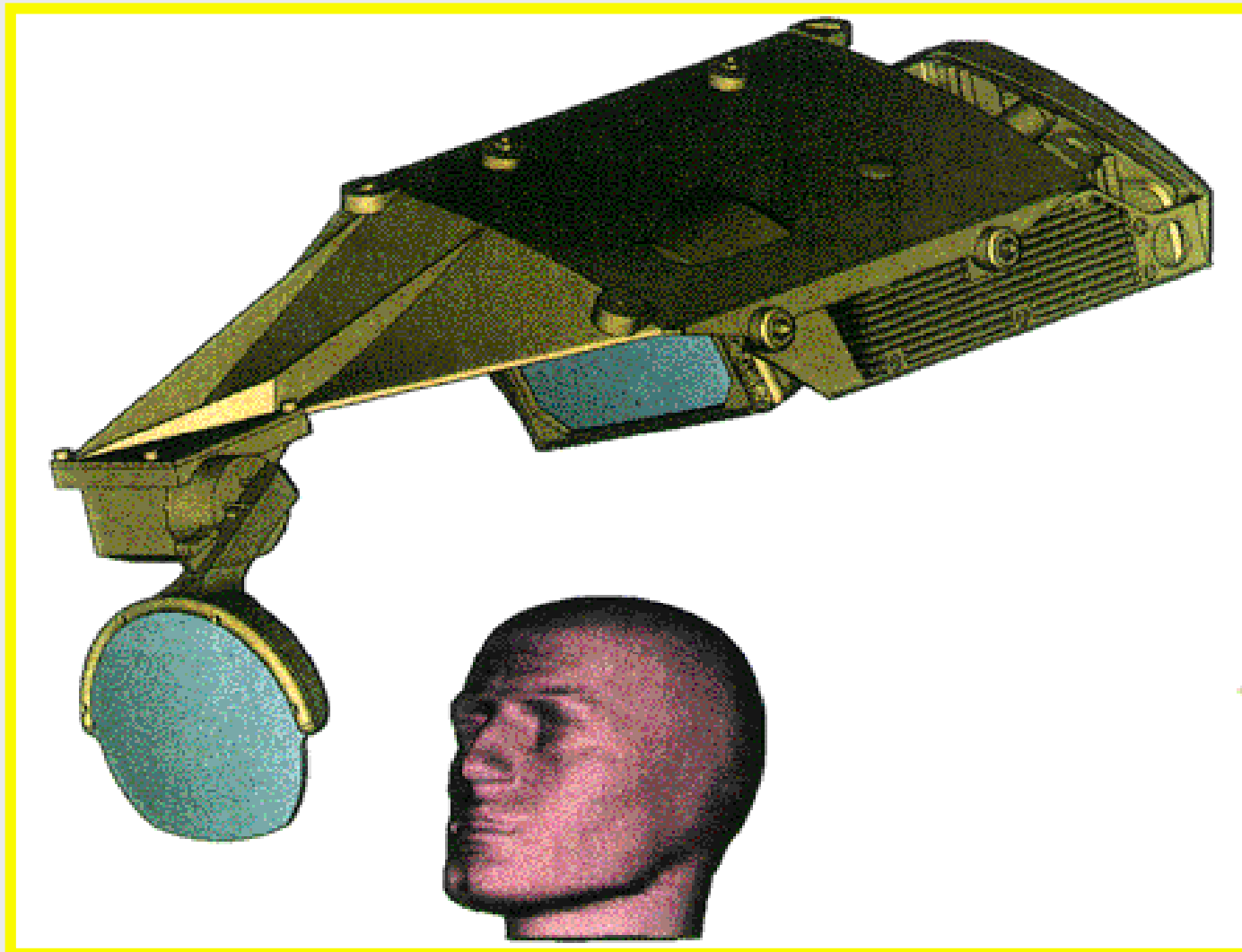
THE PARTS

- **Nose-mounted infrared camera**
- **Sapphire Window**
 - Heated
- **Image-processing software algorithms**



- **Real Time conformal image displayed on the Head Up Display (HUD) combiner**
- **Copilot Aux Display**

GULFSTREAM HUD 2020



St. Pat' s Day, 2004



THE CAMERA

- **Kollsman IR camera**
- **Uses advanced “InSb” technology**
 - **Advanced Cooled Detector**
- **Designed to Detect Approach Lights**
- **Patented image processing algorithms**





VIEW THROUGH HUD

Through HUD
EVS Image

Auto

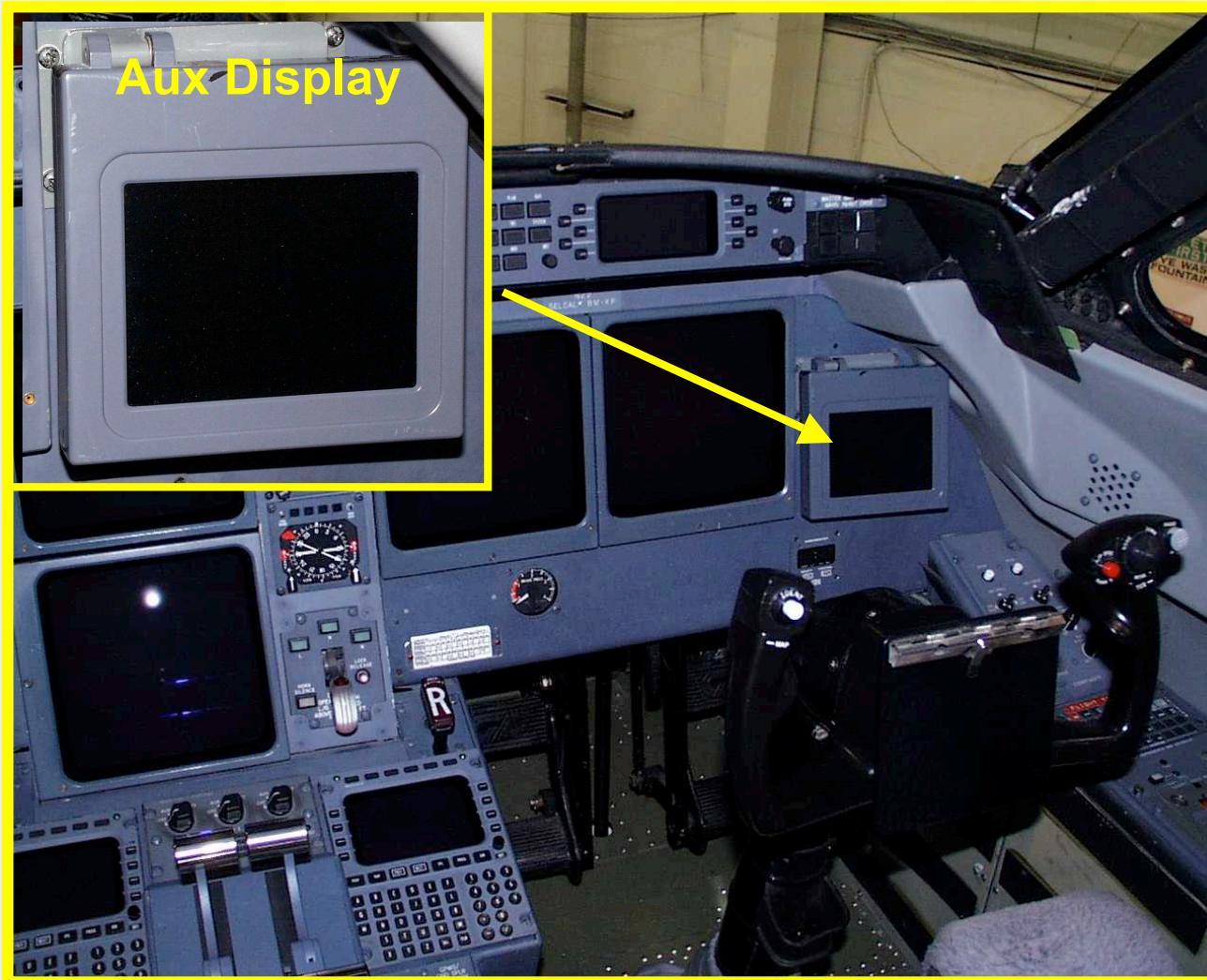


Clear

Normal View



EVS AUX FLAT PANEL DISPLAY



St. Pat' s Day, 2004



EVS IMAGE ON AUX DISPLAY



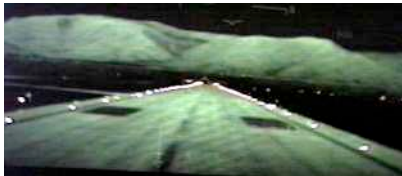
St. Pat' s Day, 2004



INFRA RED INFO

- **Visible spectrum .4 to .7 microns**
- **Military FLIRS generally look a 8-12 microns**
- **Runway lights radiate approx 1.2-2.2 microns**
- **Black Body 3-5 microns**
- **Over 70% of runway approach light energy is in the IR band**





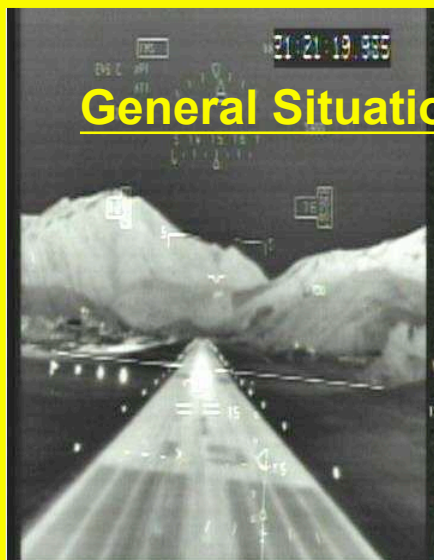
WHAT CAN EVS DO FOR ME?



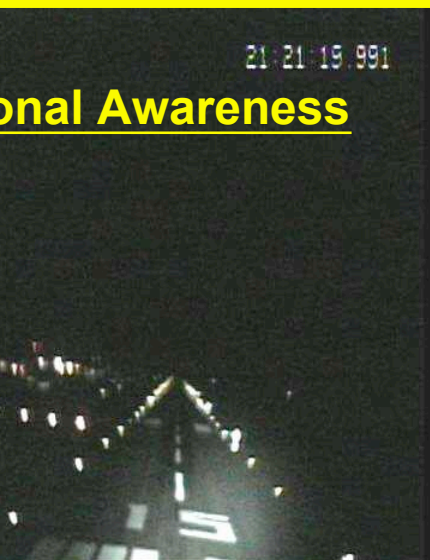
Runway Incursion



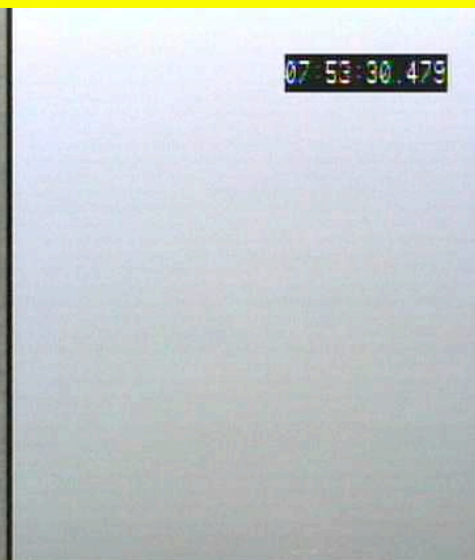
CFIT Prevention



General Situational Awareness



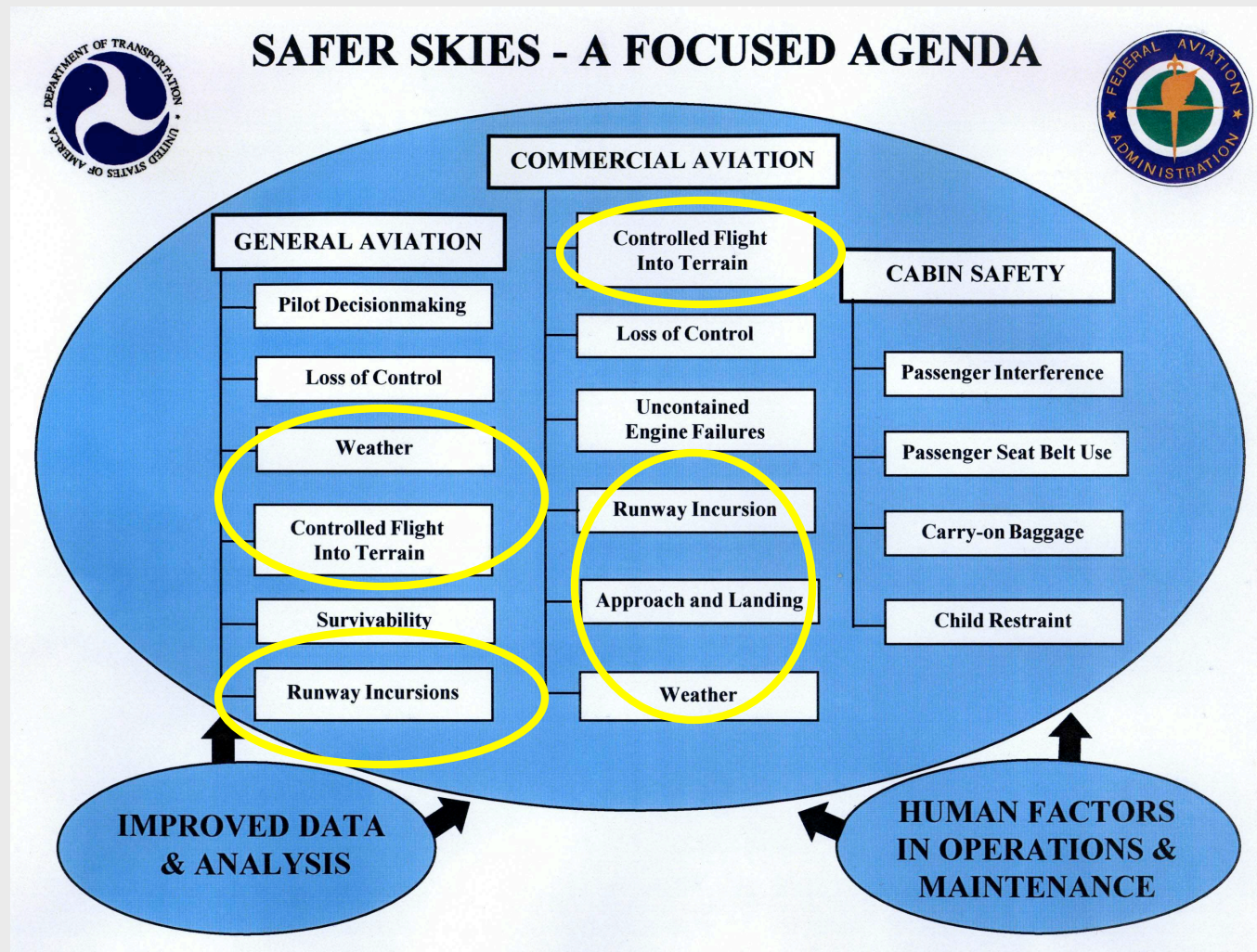
Approach

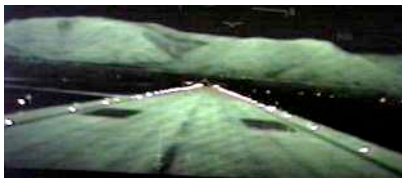




EVS AND SAFER SKIES

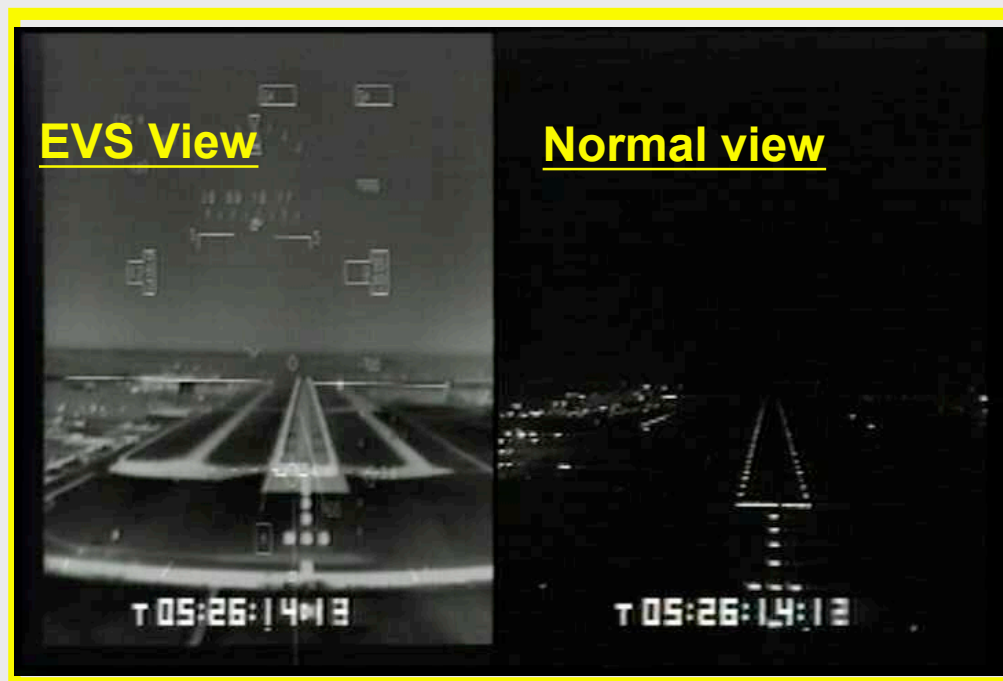
Items addressed by EVS





ILS APPROACHES WORLD WIDE

- **2,638** ILS Approaches in Jeppesen's Data Base
- **211 Cat II**
- **126 Cat III**
- **Improvement at 2300 Runways**





TRAINING

- **FAA Approved Training**
- **Classroom Instruction**
- **Simulator**
- **Required for Pilot Flying**

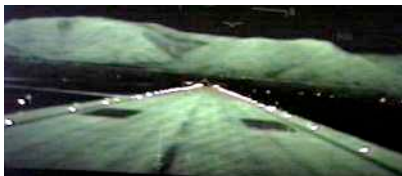




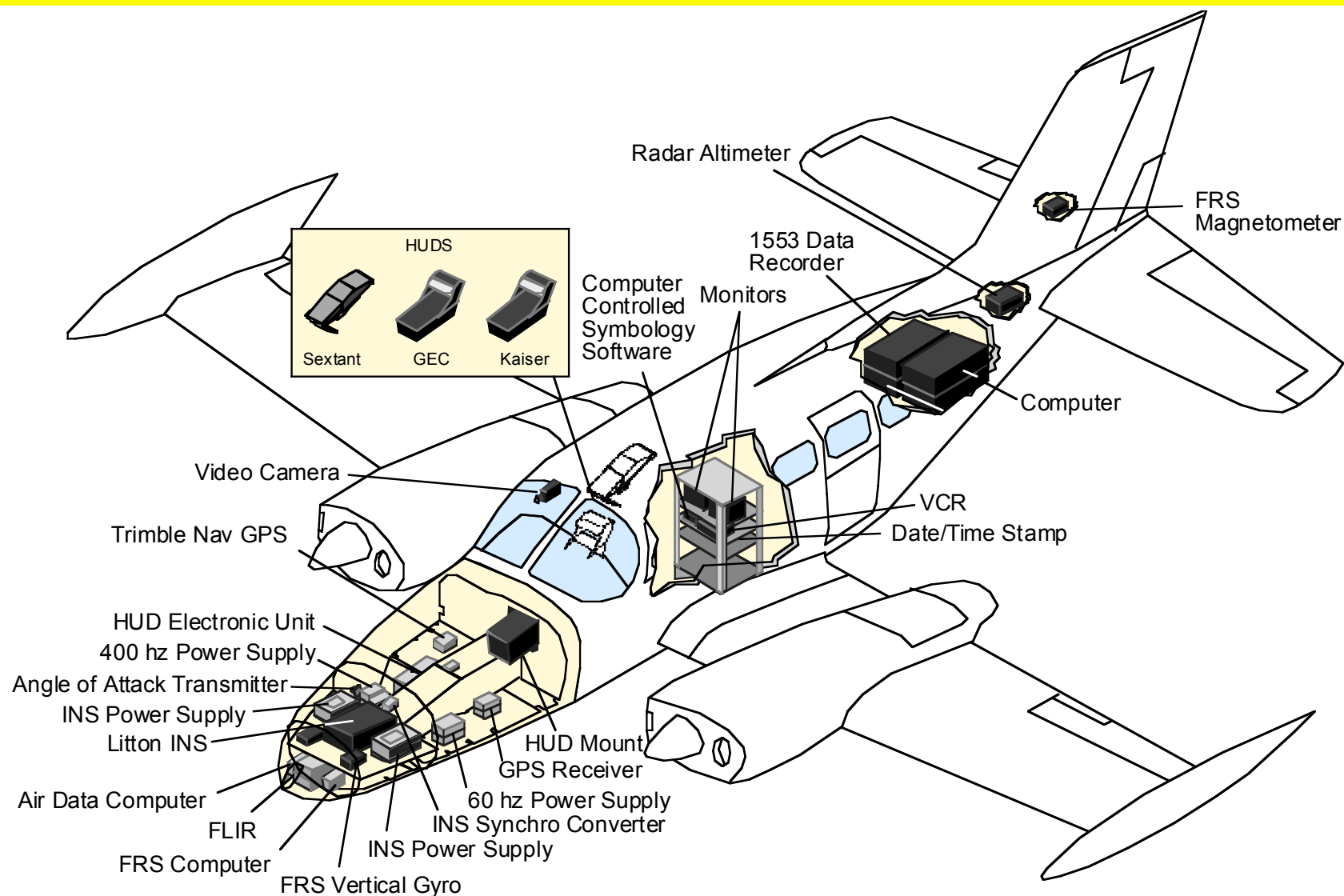
CERTIFICATION EFFORT

- **Required Two Complete POC Programs**
 - C 402
 - G-V
- **Certification**
 - G-V
 - G-IV
 - G-550





MADL CESSNA 402 EVS TEST AIRCRAFT





POC FLIGHT TEST SUMMARY

- **C-402 POC Tests**
 - 81 Approaches
 - 4 FAA Pilots, 2 GAC
 - Glenn Connor
 - 18 Facilities
- **GV-S/N 596 POC Tests**
 - 5 FAA Pilots, 3 GAC
 - 77.4 Hours
 - 134 Approaches
 - 14 ILS Facilities





GAC EVS CERTIFICATION PROGRAM

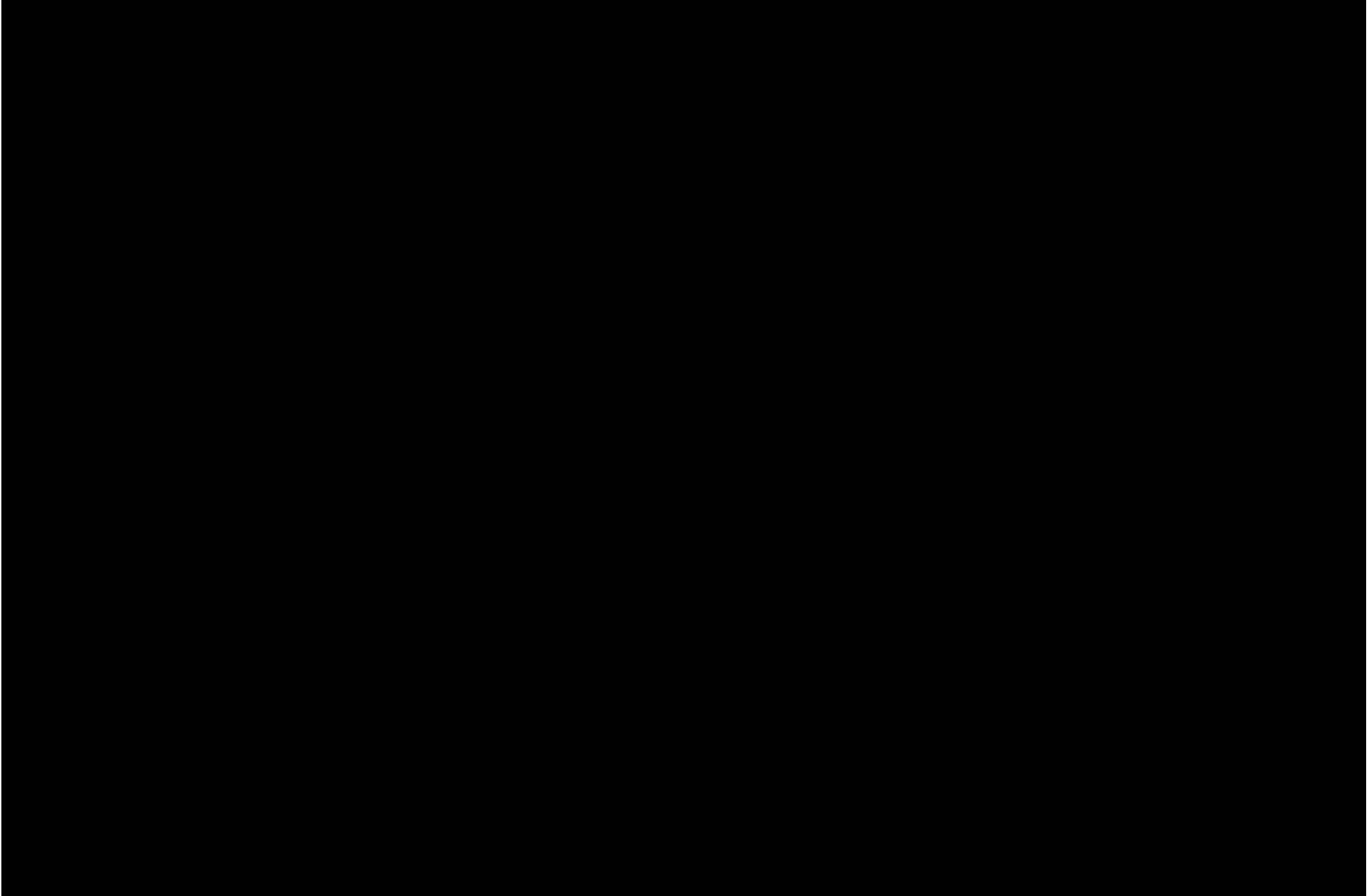
- GV
 - _ Initial System Certification
 - _ 104 approaches for credit (VMC and IMC)
 - _ 14 ILS Facilities
- GIV
 - _ Verification of system operation and configuration
 - _ 23 approaches for credit
 - _ 2 FAA pilots
- G550
 - _ Verification of system operation
 - _ 13 approaches



Aspen



EVS DEMONSTRATION VIDEO





EVS IN OPERATION

- ***80 units installed***
- ***Customers Pleased with System***
- ***Night and Low Light Important***
- ***Low Visibility Capability Extremely useful***
- ***Provides Readily Definable Operational Capability and Safety Improvements***